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PREPARATION AND EVALUATION OF HERBAL B.COMPLEX SYRUP

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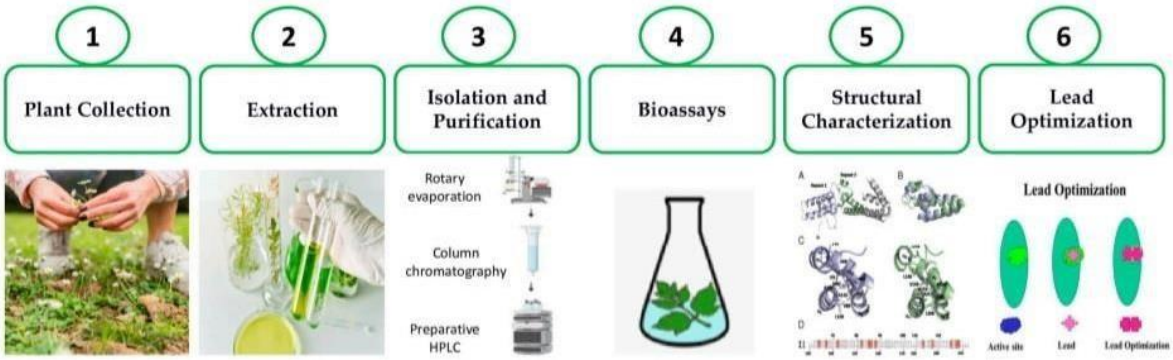
ABSTRACT

The goal of the current study was to create and assess a herbal vitamin B-complex syrup as a natural dietary supplement enhanced with vital phytoconstituents and plant-based sources of B vitamins. Selected medicinal herbs that are well-known for their vitamin content, antioxidant qualities, and health-promoting benefits were used to create the formulation. To improve palatability and stability, the herbal extracts were made using appropriate extraction techniques and added to a syrup basis that contained flavoring, preservatives, and sweeteners. A number of physicochemical characteristics, including as color, odor, taste, pH, viscosity, specific gravity, and microbial load, were assessed for the produced formulation. To evaluate the product's quality and shelf life, stability tests were carried out in both room-temperature and accelerated storage settings. Throughout the course of the investigation, the formulation demonstrated acceptable organoleptic properties, good homogeneity, suitable viscosity, and satisfactory stability. The syrup's safety within allowable bounds was verified by microbiological examination. The results indicate that the created herbal Vitamin B-Complex syrup can provide nutritional advantages with better acceptability and a lower risk of side effects, making it a safe, efficient, and patient-friendly substitute for synthetic vitamin supplements. To confirm its therapeutic efficacy and bioavailability, more pharmacological and clinical research is advised.

KEYWORDS: Herbal Vitamin B-Complex Syrup; Polyherbal Formulation; Nutritional Supplement; Physicochemical Assessment; Stability Research; Herbal Vitamins; Standardization; Quality Control.

Steps involves in the preparation of herbal B. Complex syrup



INTRODUCTION TO SYRUP

An herbal syrup is created by blending a concentrated herbal decoction with honey or sugar, and occasionally alcohol. The foundation of this syrup is a strong decoction of herbs. Adding honey or sugar not only thickens and preserves the preparation but also extends

its shelf life. This preservation method produces a soothing remedy ideal for conditions such as sore throat, cough, dryness or irritation of tissues, and digestive discomfort. The sweetness also makes the taste of certain strong or bitter herbs more pleasant, which is especially helpful for children and those sensitive to herbal flavors.[1]

Herbal syrups can be enjoyed in many ways. A spoonful or two mixed with sparkling water makes a refreshing and healthful herbal soda. Adding it to hot water creates an instant herbal tea. It can also be drizzled over foods like yogurt, oatmeal, biscuits, or even ice cream—or simply enjoyed straight from the spoon.

- Today, herbal products are considered a safer alternative to many synthetic drugs, which can pose risks to people and the environment. Herbs have been valued for their medicinal, aromatic, and flavour-enhancing qualities for centuries, and now is the time to share their benefits with the world. While almost any herb can be made into syrup, certain ones are especially well-suited for this form. Popular examples include elderberry, ginger, astragalus, hawthorn, rose hips, licorice, schizandra, and echinacea, along with aromatic spices such as cinnamon, cloves, and cardamom. Some less palatable herbs, like dandelion, horehound, elecampane, and vervain, are often prepared as syrups to improve their taste. The choice of herbs can be varied to suit your purpose and creativity. For nervous system support, herbs like lemon balm, St. John's wort, holy basil, and ashwagandha make excellent choices.

For easing digestive discomfort, fennel, ginger, cinnamon, dandelion root, and marshmallow are effective. Herbs that benefit the respiratory system include thyme, elecampane, and licorice.[1]

Definition: Herbal syrup is a thick, sticky preparation made from a concentrated sugar-and water solution, sometimes with added flavoring or medicinal ingredients.

Merits of Herbal Syrup

- No harmful side effects
- Safe for use
- Readily available
- Easy to adjust dosage for children based on their weight.

Demerits of Herbal syrup

- If preservatives are not added in the correct proportion, microbial contamination can occur.
- A rare disadvantage of herbal medicines is the possibility of self-dosing of herbs.
- Variations in storage temperature can lead to crystallization of sucrose from a saturated solution.[2]

Various ingredients used in herbal syrup formulation and their descriptions

1. Water Amaranth

Scientific name: Alternanthera sessilis.

Family: Amaranthaceae.

Fig: 7.

❖ Water amaranth (Alternanthera sessilis), also known as panagantaku or sessile joyweed, is a highly nutritious leafy green that contains a rich combination of vitamins essential for maintaining good health. It is especially abundant in Vitamin A, which supports healthy vision, boosts immunity, and keeps the skin and mucous membranes in good condition. Its high Vitamin C content works as a powerful antioxidant, helping to protect the body from harmful free radicals, improve wound healing, and enhance the absorption of iron, thereby preventing anemia. Water amaranth also provides Vitamin E, which supports healthy skin, delays signs of aging, and protects cells from oxidative damage.

In addition, it contains important B-complex vitamins such as folate, thiamine, riboflavin, and niacin, which are crucial for energy metabolism, proper functioning of the nervous system, and the production of red blood cells.

Folate in particular is vital for pregnant women as it supports proper brain and spinal cord development in the fetus. The combined presence of these vitamins makes water amaranth beneficial for reducing fatigue, improving digestion, maintaining healthy hair and skin, strengthening immunity, and supporting overall growth and vitality. Regular consumption of this leafy green, either in curries, soups, or herbal remedies, can therefore contribute significantly to maintaining a balanced vitamin intake and preventing vitamin deficiencies naturally.[2]

2. curry leaves: Scentific name: Murray

Family: Rutaceae

Fig: 8.

ς Curry leaves are a powerhouse of essential vitamins, offering numerous health benefits when included in the diet. They are rich in vitamin A, which supports healthy vision, prevents night blindness, and promotes skin health by maintaining moisture and preventing dryness. Their high vitamin C content strengthens the immune system, boosts collagen production for youthful skin, and aids in faster wound healing. Curry leaves also provide vitamin E, an antioxidant that protects cells from oxidative stress, supports heart health, and improves skin texture. The presence of vitamin B-complex, including folic acid (B9) and riboflavin (B2), plays a key role in energy production, red blood cell formation, and healthy nervous system functioning. These vitamins, along with the leaves' natural antioxidants, help lower cholesterol, regulate blood sugar levels, and improve digestion. Regular consumption can also benefit hair health, as vitamin A and B vitamins nourish hair follicles, reduce hair fall, and premature greying. Overall, curry leaves act as a natural, vitamin-rich remedy that supports eye health, boosts immunity, improves metabolism, and protects the body against age-related disorders.[3]

3. Fenugreek

Scientific name: Trigonella foenum- graecum
Family: Fabaceae.

Fig 9.

ς Fenugreek a popular spice and medicinal plant, is rich in several vitamins that contribute to many health benefits. It contains vitamin A, which helps keep the eyes healthy and improves skin glow; vitamin C, which boosts immunity, helps wounds heal faster, and keeps the skin firm; and vitamin K, which supports proper blood clotting and bone strength. Fenugreek seeds also have B vitamins such as thiamine (B1), riboflavin (B2), niacin (B3), and folate (B9), which play an important role in keeping the body energetic, supporting brain function, and improving digestion. These vitamins, along with minerals and antioxidants present in fenugreek, can help control blood sugar levels, making it useful for people with diabetes. They also support heart health by improving cholesterol balance, reducing inflammation, and aiding in weight management. The vitamin-rich nature of fenugreek makes it helpful for hair growth, skin health, and even in reducing fatigue. Overall, adding fenugreek to the diet in small amounts can provide a natural boost to the body's health and well-being.[4]

4. boilled rice

Scientific name: Oryza sativa.
Family: poaceae.

Fig: 10.

❖ Boiled rice, especially when prepared from whole or parboiled grains, is a gentle and nourishing food that provides a steady source of energy along with essential vitamins. It is a good source of B vitamins, such as thiamine (B1), niacin (B3), and vitamin B6, which help in converting food into energy, support healthy nerve function, and promote better brain health. These vitamins also aid in the formation of red blood cells and help maintain good skin health. Boiled rice contains small amounts of vitamin E, which acts as an antioxidant and supports immune function. When made from brown or unpolished rice, it retains more vitamins, particularly folate (B9), which is important for cell growth and DNA formation, making it beneficial for pregnant women. The gentle nature of boiled rice makes it easy to digest, making it ideal for people recovering from illness or those with sensitive stomachs. Regular inclusion in the diet can help maintain healthy metabolism, provide consistent energy without spiking blood sugar too rapidly, and contribute to overall wellness due to its vitamin content.[5]

5. jaggery

Scientific name: Saccharum officinarum
Family: Poaceae

Fig: 11.

❖ Jaggery, a traditional unrefined sweetener, is more than just a natural alternative to sugar—it also provides small but valuable amounts of vitamins that support overall health. Unlike refined white sugar, jaggery retains trace vitamins such as B vitamins (including B1, B2, B3, and B6), which play a role in converting food into energy, maintaining healthy nerves, and supporting brain function. It also contains folate (B9) in modest amounts, which helps in the production of red blood cells and is especially beneficial for pregnant women in supporting fetal development. Jaggery has small traces of vitamin A, important for vision and immune strength, and vitamin C, which supports collagen production, wound healing, and immunity. Being rich in minerals along with these vitamins, jaggery helps improve hemoglobin levels, reduces fatigue, and boosts stamina. Its natural antioxidants, in combination with vitamin content, help combat free radicals and reduce oxidative stress. Regular but moderate consumption of jaggery can support digestion, cleanse the body of toxins, and provide quick energy while offering more nutrients than refined sugar.[6]

6. Dattes

Scientific name: Phoenix dactylifera

Family: Arecaceae

Fig: 12.

❖ Dates are naturally sweet fruits packed with energy and a variety of vitamins that contribute to overall health and well-being. They are a good source of B vitamins such as thiamine (B1), riboflavin (B2), niacin (B3), vitamin B6, and folate (B9), all of which help the body convert food into energy, support brain function, and maintain healthy nerves. Folate in dates is particularly important for red blood cell production and healthy fetal development during pregnancy. Dates also contain vitamin A, which plays a key role in maintaining good vision, healthy skin, and strong immunity. Small amounts of vitamin K found in dates help in blood clotting and support bone health. In addition, their antioxidant content, along with vitamins, helps protect cells from damage, reduces inflammation, and supports heart health. Because they are naturally high in fiber and easy to digest, dates provide quick energy, making them an ideal snack for athletes, people recovering from illness, or anyone needing an instant boost, all while nourishing the body with essential vitamins.[7]

Roles of ingredients used in vitamin B complex syrup

Table 1: Ingredients and process.

Sr .No	Ingredient	Health benefit
1.	Curry leaves	Stimulant
2.	Spinach	Nutritive
3.	Amla	Antioxidant
4.	Jaggery	Sweetener
5.	Boiled rice	Demulcent
6.	Fenugreek	Carminative
7.	Dates	Tonic

Preparation of syrup

Table: 2.

Sr. No	Ingredient	Quantity
1.	Curry leaves	25g
2.	Spinach	25g
3.	Jaggery	100g
4.	Boiled rice	25g
5.	Fenugreek	5g
6.	Amla	1-2-30g
7.	Dates	3-4

Procedure for the formulation of syrup

Step-by-Step Procedure as follows

1. Preparation of plant material

1. Wash curry leaves, water amaranth,and thoroughly to remove dust.
2. Chop water amaranth and curry leaves ccoarsely.
3. Soak dates in warm water (10 min) for softebittern.
4. Lightly roast fenugreek seeds in a dry pan (low heat, 1–2 min) until aromatic — this reduces Bitterness.

2. Extraction of nutrients

1. In a deep stainless-steel pan, add curry leaves, water amaranth, boiled rice, roasted fenugreek seeds and 250 ml water.

2. Simmer on low flame for 15–20 minutes with lid closed.

3. After cooking, allow it to cool slightly.

3. Grinding and filtration

1. Transfer the boiled mixture to a blender.
2. Add soaked dates and the water they were soaked in.
3. Blend to a smooth paste
4. Filter through a clean muslin cloth or fine sieve to obtain a nutrient-rich extract.

4. Syrup base preparation

1. In a separate pan, melt jaggery with remaining 500 ml water over low heat.
Remove scum/impurities if present.
2. Once jaggery is fully dissolved, add the filtered herbal extract.

5. Concentration

1. Simmer the combined mixture on low flame until it reduces to about 500 ml.
2. Stir occasionally to avoid sticking at the bottom.
3. This concentration step also helps preserve the syrup.

6. Cooling & storag

1. Allow the syrup to cool completely.
2. Pour into sterilized glass bottles.
3. Store in the refrigerator for up to 3 weeks.
4. For longer shelf life, we added natural preservatives like lemon juice (vitamin C boost)and honey

Dosage suggestion

Adults: 1–2 tablespoons daily after meals Children: 1 teaspoon daily after meals

Ingredients For syrup formulation

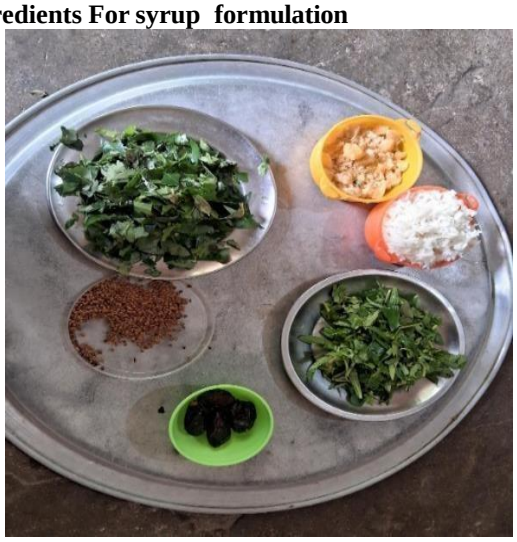


Fig: 13.

Grinding of boiled herbal Ingredients

Fig:14.

Filtered herbal Syrup

Fig:15.

Evaluation parameters for herbal vitamin B complex syrup

1. **Organoleptic Characters –** Colour, odour, taste, and appearance.
2. **pH Measurement –** To check the acidity/alkalinity of the syrup**.**
3. **Viscosity –** Flow property of the syrup.
4. **Specific Gravity –** To ensure consistency in formulation
5. **Total Solid Content –** To check the concentration of dissolved solids.
6. **Density**

Procedure for the evaluation parameters

1) Organoleptic characters (colour, odour, taste, appearance)

1. Sample & lighting: Pour ~10 mL into a clear glass under neutral daylight (D65) or white light.
2. Colour: Compare against a white background; note hue, intensity, and any discoloration.

3. Appearance/clarity: Swirl gently; check for haze, sediments, bubbles, foreign matter.
4. Odour: Waft the aroma over the nose (don't inhale directly); describe (herbal, sweet, off-odour, alcoholic, etc.).
5. Taste (only if food-grade & approved): Using sterile disposable spatula/cup, taste a drop; note sweetness/bitterness/after-taste. Rinse and record. (Skip taste if not approved.

2) pH measurement

1. Calibrate meter: Standardize with buffer pH 4.00 and 7.00 (and 10.00 if needed) at 25 ± 2 °C.
2. Prep sample: Bring syrup to room temp, mix gently to remove bubbles.
3. Measure: Rinse electrode with distilled water, blot dry, immerse in sample; stir gently.
4. Stabilize & read: Wait until reading stabilizes; note pH and temperature.
5. Replicate & record: Take triplicate readings, rinse between runs; report mean ± SD.

3) Viscosity (Brookfield viscometer)

1. Condition: Bring sample to 25 ± 0.5 °C; remove air bubbles (rest 10 min).
2. Select spindle/speed: Choose spindle per viscosity range (e.g., LV #2) and a speed (e.g., 30–60 rpm) that gives 10–90% torque.
3. Mount & immerse: Attach spindle; immerse to the immersion mark without touching container walls.
4. Run & read: Start instrument; after ~1 min stabilization, record viscosity (mPa·s or cP).
5. Replicate: Take three readings at the same temp; report mean ± SD and test conditions (spindle/speed/temp).
6. (If no Brookfield: use an Ostwald/Falling-ball viscometer and compute relative viscosity vs. water.)

4) Specific gravity (pycnometer method)

1. Tare: Clean/dry pycnometer; weigh empty (W_0).
2. Water weight: Fill with distilled water at 25 °C; wipe outside; weigh (Ww).
3. Sample weight: Empty, dry, then fill with syrup at 25 °C; weigh (Ws) 4.Calculate: Specific gravity = (Ws – W_0) / (Ww – W_0).
5. Repeat: Perform in duplicate/triplicate; report mean and temperature.

5) Total solid content (oven-drying)

1. Prep dish: Dry a flat moisture dish at 105 °C, cool in desiccator, weigh (W_1).
2. Weigh sample: Add ~2–3 g well-mixed syrup; weigh dish + sample (W_2).
3. Dry: Oven at 105 °C for 3–4 h; cool in desiccator 30 min; weigh (W_3).
4. Constant weight: Repeat dry–cool–weigh cycles until change ≤ 1 mg. 5.Calculate: % Total solids = $[(W_3 - W_1) / (W_2 - W_1)] \times 100$. (Moisture % = 100 –total solids.)

6) Density

1. Prepare & tare: Clean, dry, and stoppered pycnometer. Record mass of empty, dry bottle with stopper (M_0).
2. Determine volume (once): Fill with distilled water at 25 °C, insert stopper (no bubbles), wipe outside, weigh (M_1). Compute bottle volume:

$V = (M_1 - M_0) / \rho water(25\ °C \approx 0.9970\ g\ mL^{-1})$.

3. Charge with sample: Empty, dry the bottle, then fill with the herbal B-complex syrup at the same temperature (25 °C), insert stopper carefully to avoid bubbles, wipe.
4. Weigh sample-filled bottle: Record mass (M_2).
5. Calculate density: Density of syrup ($g\ mL^{-1}$) = ($M_2 - M_0$) / V.

RESULT

Table: 3.

Si.No	Organoleptic parameters	Observation
1.	Colour	Light yellowish Green
2.	Odor	Aromatic
3.	Taste	Sweet

Table: 4.

Si.No	Evaluation parameters	Observation Values
1.	PH test	6.04
2.	Viscosity	0.0035pa.s 3.60cp.
3.	Specific gravity	0.5125
4.	Density	1.08gm

CONCLUSION

The formulation studies of the prepared herbal B-Complex syrup using boiled rice, jaggery, water amaranth, fenugreek, and honey were conducted successfully and found to meet the required specifications. The physical attributes such as colour, aroma, taste, density, and viscosity were within acceptable limits and satisfactory for consumer use.

The final formulation (F1) showed better stability and nutrient retention compared to other trials (F2, F3). The inclusion of vitamin B-rich ingredients along with natural antioxidants makes this formulation beneficial for overall health. The final syrup can serve as a valuable dietary supplement and can be recommended for large-scale production to support nutritional needs and research in herbal health products.

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